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General Notes.

PETROGRAPHY.[1]

Ancient Volcanics in Michigan.—In an area in Michigan covered by Townships 42 to 47 N. and Ranges 30 to 34 West, is a succession of granites and gneisses overlain by a thickness of some 3000 feet of volcanic rocks, embracing acid and basic flows and tuffs. Among the basic rocks Clements[2] finds porphyrites and melaphyres, and among the acid ones quartz-porphyries and devitrified rhyolites. The melaphyres and porphyries are described under the names apo-basalts and apo-andesites, because they are altered forms of basalts and andesites. Some of the andesites are amygdaloidal, and nearly all show the effects of pressure. Andesitic and basaltic tuffs are both present. They exhibit no special peculiarities. The quartz porphyries among the acid flows are notable for the existence in them of corroded phenocrysts of quartz in which there has been developed a well marked rhombohedral cleavage. The groundmass of these rocks is sometimes micro-granitic and at other times is micro-poicilitic. The latter structure is peculiar in that it is produced by a reticulating net work of uniformly oriented quartz, between the meshes of which are irregularly shaped areas of orthoclase. The other acid lavas and the acid tuffs are similar to corresponding rocks elsewhere. The series is interesting as affording another illustration of a typical volcanic series of Pre-Cambrian age. It is one of the oldest accumulations of volcanic debris and lavas thus far described.

Gneisses of Essex Co., N. Y.—In a recent bulletin on the geology of Moriah and Westport Townships, Essex Co., N. Y., Kemp[3] gives a general account of the petrography of the gneisses, limestones, black schists, gabbros, anorthosites and dyke rocks of these regions. Most of these rocks have already been described in more detail in other papers. The gneisses are of several varieties. The most common is a member of the basement complex underlying the other rocks of the district. It is a biotite gneiss composed of quartz, micro-perthite, orthoclase, plagioclase and brown biotite, all of which minerals exhibit evidences of dynamic metamorphism. Near iron ore bodies the gneiss becomes more basic, abundant green or black hornblende, green augite and a large quantity of plagioclase taking the places of the usual gneissic constituents.

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[1] Edited by Dr. W. S. Bayley, Colby University, Waterville, Me.

[2] Journal of Geology, Vol. III, p. 801.

[3] Bull. N. Y. State Mus., Vol. 3, No. 14, 1895, p. 325.

Volcanic Rocks in Maine.—In a preliminary notice on the rocks of the Flox Islands, Maine, G. O. Smith[4] gives a brief account of the association of lavas and breccias on North Haven and Vinal Haven Islands. On North Haven the series consists of beds of porphyrites and of coarse volcanic breccias and conglomerates, layers of tuffs and sheets of quartz-porphyry. The porphyrites are sometimes olivinitic. The conglomerates and breccias are composed of fragments of the porphyrites cemented by a porphyritic matrix. The quartz-porphyry possesses no unusual features. On Vinal Haven the rocks are predominantly acid, comprising many banded and spherulitic felsites that were originally glassy rocks. The spherulites are felsitic or fibrous and are certainly original structures, since transitions from the felsitic into brecciated rocks may be traced, in the latter of which occur spherulites that were formed prior to the brecciation. The acid layers of the series are younger than the basic beds.

Spotted Quartzites, S. Dakota.—The Sioux quartzites in Minnehaha Co., S. Dakota, grade upward into variously colored quartz slates that are composed of quartz grains, iron oxides and mica in an argillaceous matrix that has crystallized in part as sericite, kaolin and chlorite. Many of the slates are marked by spots that are lighter than the body of the rocks. These spots are essentially of the same composition as the groundmass in which they lie, except that they contain less iron oxide. Their lighter color is due to bleaching out of the iron salt through the acid, probably of decomposing organic matter.[5]

The Gneisses and 'Leopard Rock' of Ontario.—The gneisses interstratified with the limestones in the Grenville series, north of Ottawa, Canada, vary much in character.[6] The predominant variety is a granitoid aggregate of reddish orthoclase and grayish-white quartz, a little or no mica, and sometimes garnets. Its bedding is very obscure. When the mica is abundant in the rock foliation is distinct. One variety of the rock is called by Gordon syenite-gneiss. It includes the 'leopard rock' of the Canadian geologists. The rock occurs as dykes cutting quartzites and pyroxenites. All the phases of the gneisses show the effects of pressure. The 'leopard rock' consists of ellipsoidal or ovoid masses of feldspar and a little quartz, separated from each other by narrow anastomosing partitions of green interstitial substance composed of pyroxene and feldspar. When the ellipsoids are flattened by foliation the rock becomes a streaked gneiss. Under the microscope, in sections of the coarse grained gneisses, large crystals of pyroxene, microcline and quartz are seen to be imbedded in a fine grained aggregate of microcline and quartz. In the ellipsoidal varieties the ellipsoids are composed mainly of microcline grains and the interstitial mass is a fine grained mosaic of feldspar, quartz and augite. In the streaked gneiss the augite is partially changed to green hornblende, while crystalloids of idiomorphic hornblende indicates that some of this component is an original crystallization. The rocks are evidently sheared pyroxene-syenites. The author discusses the use of the term 'gneiss' and suggests that the term 'gneissoid' be restricted to the description of foliated eruptive rocks whose structure is due to magma motions, that 'gneiss' be used as a suffix to the name of any rock that has assumed the typical gneissic structure since its original consolidation, as diorite gneiss, etc., and that the ending 'ic' be used with reference to the mineralogic composition of a foliated rock whose origin is unknown—a dioritic gneiss, in this sense indicates a folaited rock whose present composition is that of a diorite.

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[4] Johns Hopkins Univ. Circulars, No. 121, p. 12.

[5] Beyer: Ib., No. 121, p. 10.

[6] Bull. Geol. Soc. Amer., Vol. 7, p. 95.

Petrographical Notes.—In thin sections of sandstone inclusions that have been melted by basalts, Rinne[7] finds the remains of quartz grains surrounded by rims of monoclinic augite, cordierite, spinel, etc. In some of the glasses formed by the melting of the sandstone are trichites and crystallites of orthorhombic pyroxene. While this substance is found abundantly as a contact mineral in the sandstones enclosed in the basalts of Sababurg, the Blauen Kuppe and Steinberg, the author nevertheless regards it as a comparatively rare product of the contact action between these two rocks.

Bauer[8] declares that the rubies, sapphires, spinels and other gem minerals from northern Burma occur in a metamorphosed limestone on its contact with an eruptive rock whose nature is not known.

Penfield[9] obtains a heavy solution for the separation of mineral powders whose densities range between 4.6 and 4.94 by melting together silver and thallium nitrates in different proportions. The molten mass attacks sulphides, but otherwise is of much value in separating mixtures of heavy minerals.

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[7] Neues Jahrb. f. Min., etc., 1895, II, p. 229.

[8] Sitzb. d. Ges. z. Beförd der gesamnet Naturw. Marburg, 1896, No. 1.

[9] Amer. Journ. Sci., Dec., 1895, p. 446.

La Touche[10] describes an apparatus to be used in connection with diffusive columns of methylene iodide for the purpose of determining the density of minute fragments of minerals.

GEOLOGY AND PALEONTOLOGY.

Geology of the French Congo.—The Congo region belonging to France is greater in extent than the parent country. Through the enterprise of different explorers and the researches of scientific men, notably geologists and paleontologists, much information concerning this great tract of country has been acquired since 1871. M. Barrat has systematized the facts on record and publishes an interesting paper under the title " Geology of the French Congo," in which he embodies also the results of his own explorations in the valley of the Ogoove.

The observations of M. Pouel, made during a stay of many years in the region under discussion, confirm the conclusions of M. Barrat as to the great stratigraphic uniformity of the Congo. Furthermore, the formation of the basin after the uplift of the African plateau is explained by the progressive draining of a series of reservoirs, more or less depressed, placed at different altitudes and discharging from one to another toward the ocean. The limits of these reservoirs are in relation to the ancient rock ridges now hidden beneath the sandstone but occasionally laid bare by erosion.

Around the border of the basin, the formations plainly demonstrate that they were elevated as early as the carboniferous epoch, and although greatly leveled since, still show the primary reliefs. One of the most interesting is the formation of Adamaona ; its substratum is granitic and metamorphic like the Crystal Mountains and the Mouamba Mountains and the region of Katanga, and there are also rocks which are similar to the Devonian of the Lower Congo. The whole formation has been intersected and to a great extent covered by erupted material, probably Cenozoic, and by outflows from volcanoes of undoubtedly much more recent age.

The structure of the plateaus of Adamaona is somewhat analogous to that of the central plateau of France. (Extr. Ann. des Mines liv. d'Aril, 1895.)

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[10] Nature, Jan., 1896, p. 198.